NOTES ON VARIATION IN *PSEUDOGNAPHALIUM OBTUSIFOLIUM* (ASTERACEAE: GNAPHALIEAE)

Guy L. Nesom

Botanical Research Institute of Texas
509 Pecan Street
Fort Worth, TX 76102-4060, U.S.A.

ABSTRACT

Pseudognaphalium (*Gnaphalium*) *obtusifolium* sensu stricto is variable over its geographic range in the glandularity of stems and upper leaf surfaces, but the variation is difficult to characterize geographically. Variety *praecox*, described from localities on the Atlantic and Gulf coastal plains on the basis of early-season flowering and an elongate capitulescence, can only be arbitrarily separated from the species and does not deserve formal recognition. Variety *micradenium*, which has been treated at varietal rank within both *Gnaphalium obtusifolium* and the closely related *Gnaphalium helleri*, is distinct in morphology from both and apparently reproductively isolated. It is given equivalent taxonomic rank as ***Pseudognaphalium micradenium*** (Weatherby) Nesom, comb. et stat. nov.

RESUMEN

Pseudognaphalium (*Gnaphalium*) *obtusifolium* sensu stricto es variable a lo largo de su distribución geográfica en la glandulosidad de sus tallos y haces foliares, pero la variación es difícil de caracterizar geográficamente. La variedad *praecox*, descrita de localidades del Atlántico y llanuras costeras del Golfo en base a su floración temprana y una capitulescencia alargada, sólo puede ser separada de la especie arbitrariamente y no tiene reconocimiento formal. La variedad *micradenium*, que ha sido tratada a nivel varietal tanto en *Gnaphalium obtusifolium* como en *Gnaphalium helleri*, es distinta morfológicamente de ambas y al parecer aislada reproductivamente. Se le da el rango taxonómico equivalente como ***Pseudognaphalium micradenium*** (Weatherby) Nesom, comb. et stat. nov.

Before its transfer to *Pseudognaphalium*, as *P.* (*Gnaphalium*) *obtusifolium* (L.) Hilliard & Burtt, *Gnaphalium obtusifolium* has, at times, been treated with up to five varieties: var. *obtusifolium*, var. *praecox*, var. *helleri*, var. *micradenium*, and var. *saxicola* (e.g., Fernald 1950; Cronquist 1980; Gleason & Cronquist 1991). Aspects of variation affecting the taxonomy of the first four of these are considered in the present paper. The status of the morphologically reduced and apparently narrowly endemic *Gnaphalium saxicola* Fassett is currently under study by D.S. Feller at the University of Wisconsin. The current study is based on examination of more than 750 specimens of *P. obtusifolium* sensu lato from BRIT, GH, NCU, TEX-LL, and US.

1. Variation in vestiture in typical *Pseudognaphalium obtusifolium*

The type, distribution, and density of glandular hairs on the stems and leaves is significant in the identification of many species of *Pseudognaphalium*. Vestiture is variable within *P. obtusifolium* and published descriptions have been inconsistent.

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Blake (1918, p. 72) noted that "If the wool of a specimen of [typical] *G. obtusifolium* be removed, stipitate glands precisely similar in shape and position to those of the variety [var. *helleri*] are found." Fernald described the stems and branches as "closely white-lanate" (1936, p. 232) and "covered with a close white felt-like pubescence" (1950, p. 1464) without mentioning glands. Cronquist (1980, p. 177) observed that the stems are "thinly white-woolly, commonly becoming subglabrous (or even a little glandular) near the base;" in the key to species he noted that the stems are "scarcely glandular except sometimes near the base." Observations here are similar to Cronquist's—glands are uncommon under the closely lanate stem vestiture, and when glands do occur, they are near the base of the plant. Minute, sessile cauline glands rarely may be present beneath the cauline tomentum. Plants with glandular stems do not show other features to suggest that presence of cauline glands reflects hybrid influence of other species.

Fernald (1936, p. 232) observed that the leaves of *Gnaphalium obtusifolium* "are commonly, though not always, glandular or glandular-papillate above ..." Cronquist (1980, p. 177) described the leaves as "from glabrous to slightly glandular or slightly woolly above." Observations here confirm the variability of vestiture on upper leaf surfaces. Glandular upper surfaces are found on plants from Illinois, Minnesota, Maryland, Mississippi, Oklahoma, Arkansas, and Texas (and probably other states). The glands have short, filiform stipes more like those of [var.] *micradenium* than [var.] *helleri* (see key below), but the stipes may be so short that the glands are nearly sessile. The persistent, thickened bases of the uniseriate, filiform hairs of the tomentum may be gland-like in appearance but they are different from the biseriate, glandular hairs.

The high ratio of pistillate florets to bisexual florets in *Pseudognaphalium obtusifolium* and the small amount of pollen produced by the bisexual florets suggest that self-pollination may be the prevalent mode of fruit production (e.g., Noyes 2000); if so, formation of local morphological races would be expected. This seems to be the case in central Texas, at the very southwestern corner of the range of the species, where plants from counties on the Edwards Plateau and slightly eastward have stipitate-glandular leaves, while plants elsewhere in the state have leaves eglandular and completely glabrous to sparsely arachnoid on the upper surface. Similarly glandular leaves are produced in other parts of the range, however, and it would be inconsistent to recognize this Texas enclave with formal taxonomy. Texas plants of *P. obtusifolium*, including those with glandular and eglandular leaves, produce the lowest numbers of bisexual flowers per capitula of any sampled over the whole species range.

2. Status of *Gnaphalium obtusifolium* var. *praecox*

Gnaphalium obtusifolium var. *praecox* Fernald (= *Pseudognaphalium obtusifolium* var. *praecox* (Fernald) Kartesz) was described from coastal plain localities

in Virginia, South Carolina, Georgia, and Alabama on the basis of early-season flowering and an atypically elongate capitulescence (Fernald 1936). Its presence was later noted in New Jersey (Fernald 1950), Maryland (Brown & Brown 1984), and North Carolina (Kartesz 1999). In other regional treatments, Ahles (1968) treated var. *praecox* as a synonym of typical *Gnaphalium obtusifolium*, while Cronquist (1980) and Gleason and Cronquist (1991) did not even mention it. The taxon as an accepted entity apparently has persisted only in a few floristic accounts, e.g., Massey (1961), Brown and Brown (1984), Kartesz (1999).

Plants of var. *praecox* cited in the protologue by Fernald (1936) flowered 17 July, 23 July, 5 August, and 11 August. Other specimens (GH, US) collected by Fernald in southwestern Virginia and identified by him as var. *praecox* were flowering in August and September. Based on records from more than 600 collections of *P. obtusifolium* at BRIT, GH, NCU, TEX-LL, and US, plants at anthesis in the southeastern United States have been collected primarily from the first week of August through mid-October, with a few early bloomers in the last two weeks of July and a few late bloomers in the first two-thirds of November. Flowering times in Canada and more northern parts of the U.S. apparently begin slightly later and end slightly earlier, as most collections have been made from mid-August through September and early October. These observations extend the beginning of normal flowering of the species in the southeastern U.S., compared to the range of flowering times observed by Fernald in 1936 on the basis of GH collections. While the collections of var. *praecox* cited by Fernald are seasonally early, they are not outside the range of normal flowering for typical plants of the species and it does not seem unusual that on the Atlantic and Gulf coastal plains, with warmer temperatures and generally earlier phenologies, flowering in *P. obtusifolium* should begin earlier than elsewhere in the range.

The capitulescence of *Pseudognaphalium obtusifolium* normally is distinctly corymboid (flat-topped), this configuration usually attained before the capitula reach full anthesis. In plants described by Fernald as var. *praecox*, floriferous branches developing from relatively lower nodes and not elongating to the full capitulescence height produce a capitulescence that is "elongate-cylindric to thyrsoid." In *P. obtusifolium*, a cylindric capitulescence in full anthesis is rare, and most of the plants identified by Fernald as var. *praecox* did not produce the distinctly cylindric capitulescence shown in the type specimens (see protologue photograph). It is not uncommon to encounter a primarily corymboid capitulescence at anthesis with lower branches in various stages of earlier development or with lower branches at anthesis considerably shorter than the upper branches. Nor do such variants appear to be strongly correlated with early flowering.

Fernald (1936, p. 233) noted that "search for technical characters [to distinguish var. *praecox*] in flowers and achenes has failed to reveal them," and this is

confirmed here. Plants segregated by Fernald as var. *praecox* tend to flower in the earlier part of the phenological range of the species and their capitulescence differs in a minor and overlapping way from plants of typical *P. obtusifolium*, but no other differences separate these taxa. This evidence indicates that var. *praecox* has no status as an evolutionary entity and its taxonomic recognition is not justified.

3. Status of *Gnaphalium obtusifolium* var. *micradenium*

Var. *micradenium* was originally described at varietal rank by Weatherby (1923) as "apparently the northern and more inland representative of [*Gnaphalium obtusifolium*] var. *helleri* (Britton) Blake, which seems to be confined to the coastal plain." It was accepted at varietal rank by Fernald (1950, as *G. obtusifolium* var. *micradenium*), Mahler (1975, as *G. helleri* var. *micradenium*), and other floristic accounts. Ahles (1968), however, placed var. *micradenium* as a synonym of *G. obtusifolium* (vs. *G. helleri*), while Cronquist (1980) and Gleason and Cronquist (1991, implicitly) treated var. *micradenium* as a synonym of *G. helleri*.

Weatherby's (1923) initial contrast of var. *micradenium* and var. *helleri*, emphasizing glandularity and leaf morphology, remains relatively accurate. Difference in gland morphology and the number of florets per capitulum further sharpen the distinction. Although var. *micradenium* and var. *helleri* have largely allopatric ranges (generally as mapped by Mahler 1975), a region of sympatry exists in Georgia, South Carolina, North Carolina, and southeastern Virginia. Intermediates have not been encountered, suggesting that they are reproductively isolated. The two taxa were intermixed and collected together in Northampton Co., Virginia—var. *micradenium* (*Fernald and Long 5770*, GH), var. *helleri* (*Fernald and Long 5550* and *5551*, GH)—as noted by the label data on the collections. Evidence at hand indicates that each is reasonably treated as a distinct species, as reflected in the new combination and summarized in the morphological contrasts in the key below.

Pseudognaphalium micradenium (Weatherby) Nesom, comb. et stat. nov.
Gnaphalium obtusifolium var. *micradenium* Weatherby, Rhodora 25:22. 1923.
Gnaphalium helleri var. *micradenium* (Weatherby) Mahler, Sida 6:32. 1975.
Pseudognaphalium helleri var. *micradenium* (Weatherby) Kartesz, Synth. N. Amer. Fl. (ed. 1). 1999. TYPE: UNITED STATES. MASSACHUSETTS. Barnstable Co.: dry, sandy openings among scrub oak, Barnstable, 7 Oct 1917, *M.L. Fernald 15870* (HOLOTYPE: GH!).

1. Stems persistently white-tomentose-felted, sometimes lightly so, usually eglandular, uncommonly glandular near the base; pistillate florets 38–96, bisexual florets 4–8 (–11); plants only slightly if at all fragrant. _____ **Pseudognaphalium obtusifolium**
1. Stems quickly losing most tomentum, greenish, persistently and densely stipitate-glandular; pistillate florets 47–107, bisexual florets 7–20; plants distinctly fragrant.
   2. Stems glandular-puberulent, the stipitate glands 0.1–0.2 mm high, relatively even in height on any portion of the stem, with a filiform stalk of even width and

narrower than the gland width; pistillate florets 47–78, bisexual florets (7–)11–20; leaves linear to linear-lanceolate or linear-oblanceolate, 1.5–5.5 cm long, 1.5-10 mm wide, 6–10 times longer than wide. _____ **Pseudognaphalium micradenium**

2. Stems glandular-villous, the stipitate glands (0.1–)0.3–1 mm high, prominently variable in height on any portion of the stem, with a stalk broadened toward the base and ca equal the gland width; pistillate florets 83–107, bisexual florets 9–15; leaves mostly oblong-lanceolate, 2.5–7 cm long, 4–20 mm wide, 4–8 times longer than wide. _____ **Pseudognaphalium helleri**

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